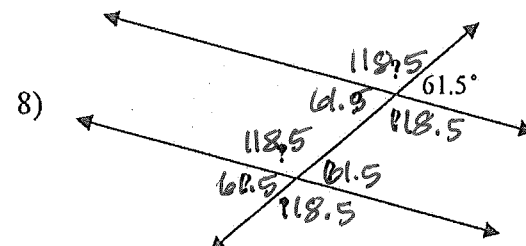
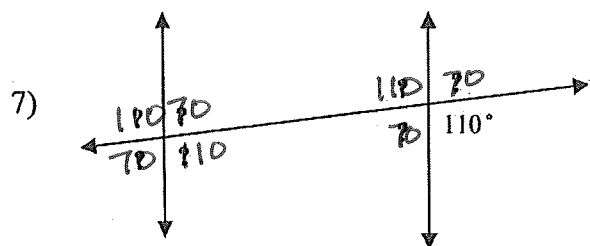
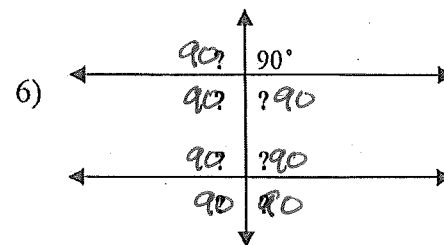
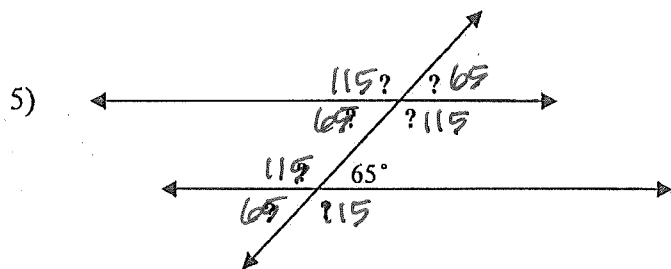
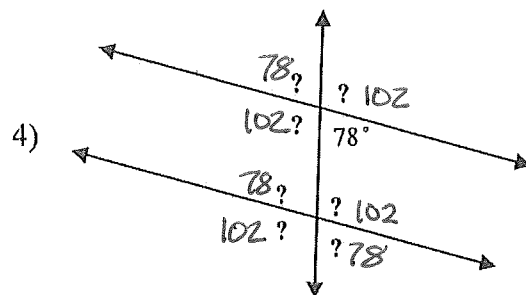
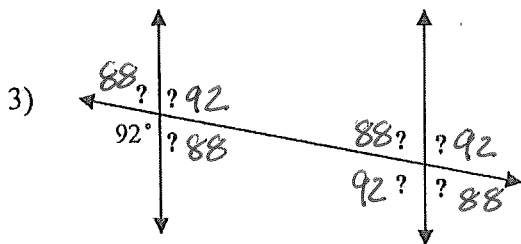
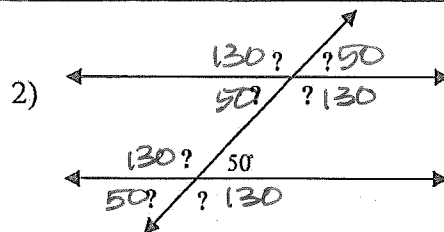
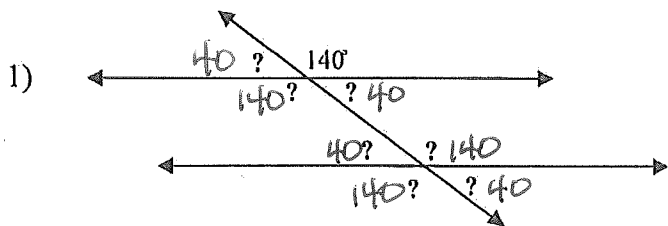
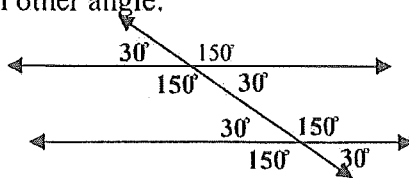


Name _____

FINDING UNKNOWN ANGLE MEASURES #2

Directions: For each set of parallel lines, you are given the measure of one angle. Use your knowledge of parallel lines and transversals to find the measures of each other angle.

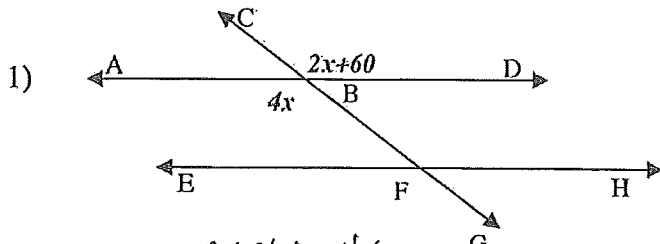
Example: Given an angle of 150°



Name _____

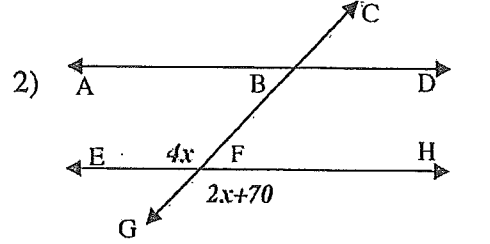
FINDING UNKNOWN ANGLE MEASURES—CONGRUENT ANGLES-#3

Directions: Find the measure of each missing angle in the parallel lines and transversals below. Each pair of angles are either *vertical angles*, *alternate angles*, or *corresponding angles*; so they are congruent. All you have to do is set up and solve an equation where the expressions are congruent. Once you've solved for x , plug that value back into each expression to find the measure of each angle.

1) 

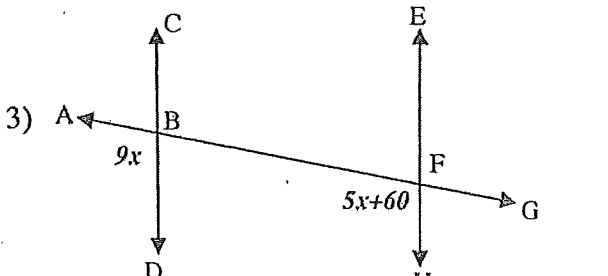
Equation: $2x + 60 = 4x$
 $60 = 2x$
 $30 = x$

$x = 30^\circ$ $\angle ABG = 120^\circ$ $\angle CBD = 120^\circ$
 $4(30) = 120$ $2(30) + 60 = 60 + 60$

2) 

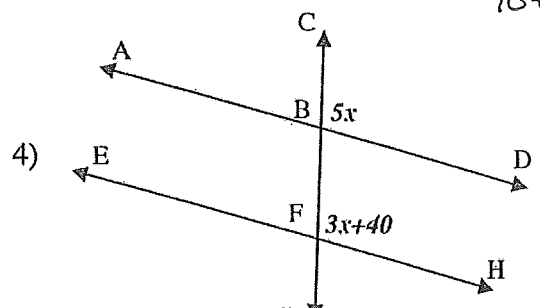
Equation: $4x = 2x + 70$
 $2x = 70$
 $x = 35$

$x = 35^\circ$ $\angle EFB = 140^\circ$ $\angle GFH = 140^\circ$
 $4(35) = 140$ $2(35) + 70 = 70 + 70$

3) 

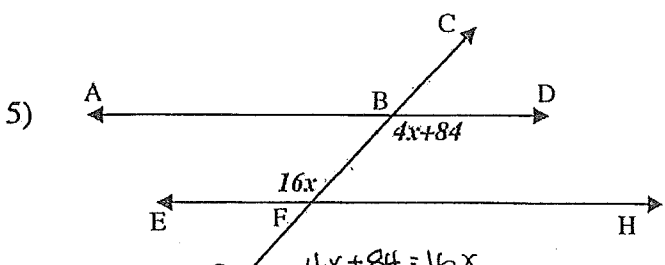
Equation: $9x = 5x + 60$
 $4x = 60$
 $x = 15$

$x = 15^\circ$ $\angle ABD = 135^\circ$ $\angle HFA = 135^\circ$
 $9(15) = 135$ $5(15) + 60 = 75 + 60$

4) 

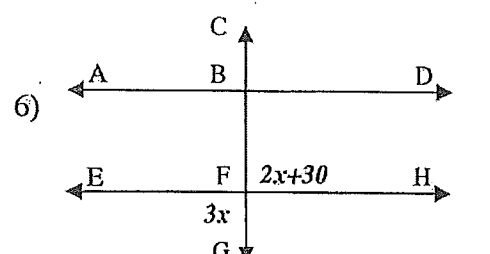
Equation: $5x = 3x + 40$
 $2x = 40$
 $x = 20$

$x = 20^\circ$ $\angle CBD = 100^\circ$ $\angle HFC = 100^\circ$
 $5(20) = 100$ $3(20) + 40 = 60 + 40$

5) 

Equation: $4x + 84 = 16x$
 $84 = 12x$
 $7 = x$

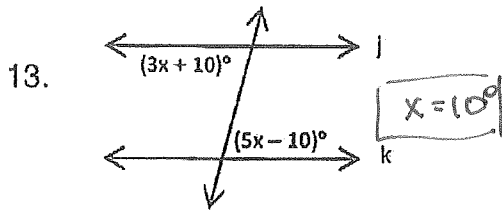
$x = 7^\circ$ $\angle GBD = 112^\circ$ $\angle EFC = 112^\circ$
 $4(7) + 84 = 28 + 84$ $16(7) = 112$

6) 

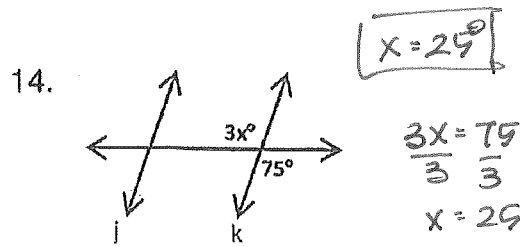
Equation: $2x + 30 = 3x$
 $30 = x$

$x = 30^\circ$ $\angle EFG = 90^\circ$ $\angle HFC = 90^\circ$
 $3(30) = 90$ $2x + 30 = 2(30) + 30 = 60 + 30$

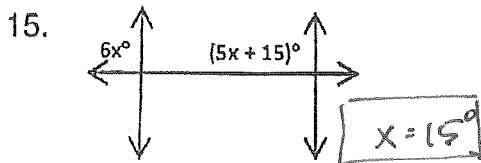
Find the value of x that makes $j \parallel k$.



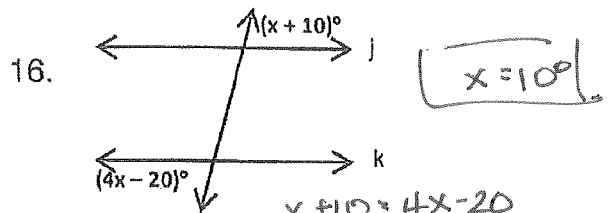
$$\begin{array}{r} 3x + 10 = 5x - 10 \\ -3x \quad -3x \\ \hline 10 = 2x - 10 \\ +10 \quad +10 \\ \hline 20 = 2x \\ \underline{\quad} \\ 10 = x \end{array}$$



$$\begin{array}{r} 3x = 75 \\ \underline{\quad} \\ x = 25 \end{array}$$

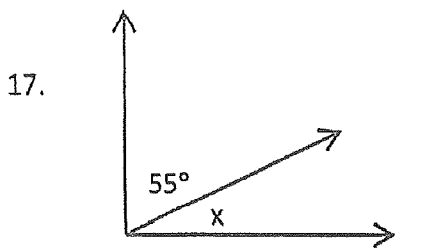


$$\begin{array}{r} 6x = 5x + 15 \\ -5x \quad -5x \\ \hline x = 15 \end{array}$$

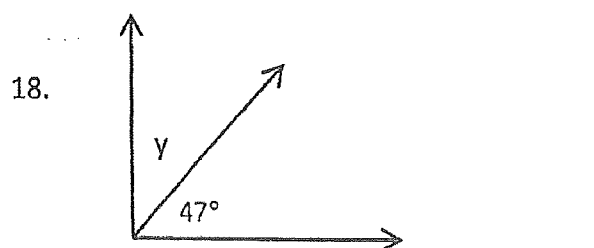


$$\begin{array}{r} x + 10 = 4x - 20 \\ -x \quad -x \\ \hline 10 = 3x - 20 \\ +20 \quad +20 \\ \hline 30 = 3x \\ \underline{\quad} \\ 10 = x \end{array}$$

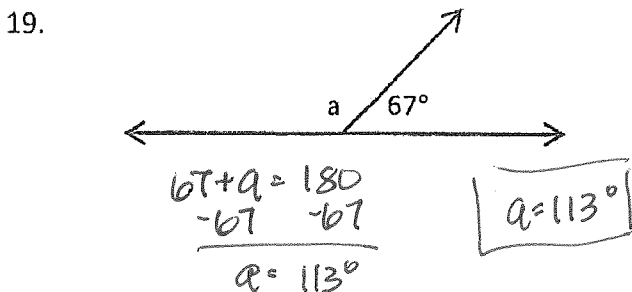
Determine the missing angles.



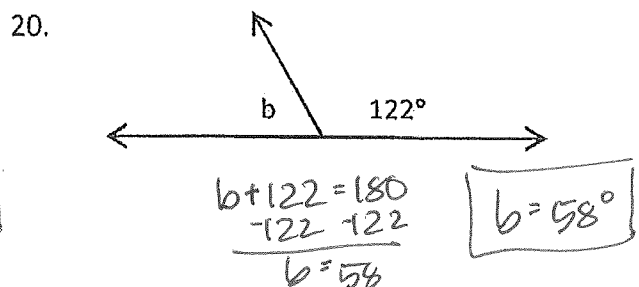
$$\begin{array}{r} 90 - 55 = x \\ 35 = x \end{array}$$



$$\begin{array}{r} 90 - 47 = x \\ 43 = x \end{array}$$



$$\begin{array}{r} b + a = 180 \\ -b \quad -b \\ \hline a = 113 \end{array}$$

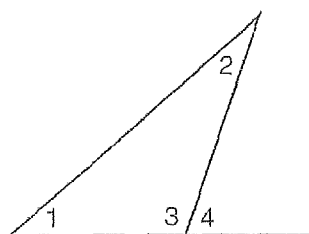


$$\begin{array}{r} b + 122 = 180 \\ -122 \quad -122 \\ \hline b = 58 \end{array}$$

Exterior Angle Theorem

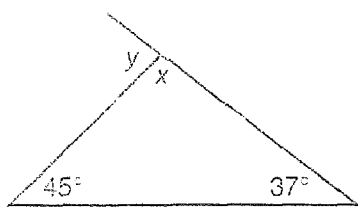
In any triangle, the measure of one exterior angle is equal to the sum of its remote interior angles.

An exterior angle and its adjacent interior angle are supplementary.



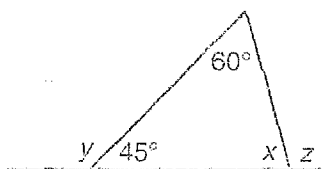
$$\begin{aligned} \angle 1 + \angle 2 &= \angle 4 \\ \angle 3 + \angle 4 &= 180^\circ \\ \angle 1 + \angle 2 + \angle 3 &= 180^\circ \end{aligned}$$

1.



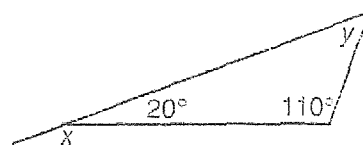
$$\begin{aligned} x &= 98^\circ & y &= 82^\circ \\ x + 45 + 37 &= 180 & x + y &= 180 \\ x + 82 &= 180 & 98 + y &= 180 \\ x &= 98 & y &= 82 \end{aligned}$$

2.



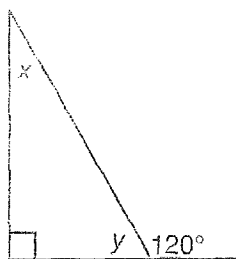
$$\begin{aligned} x &= 75^\circ & y &= 135^\circ & z &= 105^\circ \\ 60 + 45 + x &= 180 & y + 45 &= 180 & 60 + 45 + x &= 180 \\ 105 + x &= 180 & y &= 135 & 105 + x &= 180 \\ x &= 75 & x + z &= 180 & x &= 75 \\ 75 + z &= 180 & z &= 105 & 75 + z &= 180 \\ z &= 105 & & & z &= 105 \end{aligned}$$

3.



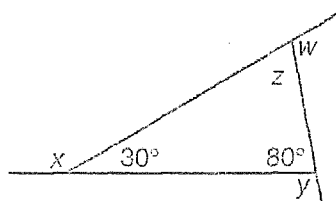
$$\begin{aligned} x &= 160^\circ & y &= 50^\circ \\ 20 + 110 + y &= 180 & x + 20 &= 180 \\ 130 + y &= 180 & x &= 160 \\ y &= 50 & & & & \end{aligned}$$

4.



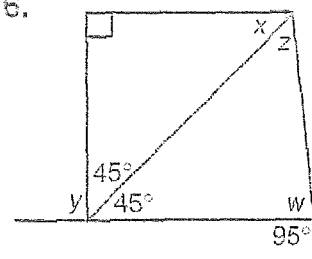
$$\begin{aligned} x &= 30^\circ & y &= 60^\circ \\ x + y + 90 &= 180 & y + 120 &= 180 \\ x + (60) + 90 &= 180 & y &= 60 \\ x + 150 &= 180 & & & & \\ x &= 30 & & & & \end{aligned}$$

5.



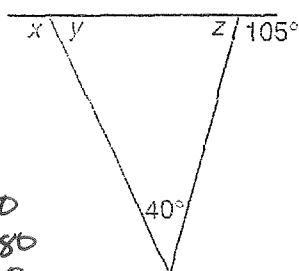
$$\begin{aligned} w &= 110^\circ & x &= 150^\circ & z &= 70^\circ \\ y &= 100^\circ & z &= 70^\circ & & \\ y + 80 &= 180 & x + 30 &= 180 & & \\ y &= 100 & x &= 150 & & \\ w + z &= 180 & 30 + 80 + z &= 180 & & \\ w + 70 &= 180 & 110 + z &= 180 & & \\ w &= 110 & z &= 70 & & \end{aligned}$$

6.



$$\begin{aligned} w &= 85^\circ & x &= 45^\circ & z &= 50^\circ \\ y &= 90^\circ & z &= 50^\circ & & \\ w + 90 &= 180 & x + 90 + 45 &= 180 & & \\ w &= 85 & x + 135 &= 180 & & \\ y + 45 + 45 &= 180 & x &= 45 & & \\ y + 90 &= 180 & 45 + w + z &= 180 & & \\ y &= 90 & 45(85) + z &= 180 & & \\ & & 130 + z &= 180 & & \\ & & z &= 50 & & \end{aligned}$$

7.



$$\begin{aligned} y + z + 40 &= 180 \\ y + (75) + 40 &= 180 \\ y + 115 &= 180 \\ y &= 65 \\ x &= 115^\circ & y &= 65^\circ & z &= 75^\circ \\ z + 105 &= 180 & x + y &= 180 & & \\ z &= 75 & x + 65 &= 180 & & \\ & & x &= 115 & & \end{aligned}$$